DEPARTMENT OF THE ARMY
SAVANNAH DISTRICT, CORPS OF ENGINEERS
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District Pamphlet 1 September 1988
No. 385-1-1

Safety and Occupational Health
GUIDE FOR PREPARATION OF AN ACTIVITY HAZARD ANALYSIS

1. Purpose. To provide guidance in preparing an Activity Hazard Analysis in accordance with EM-385-1-1.

2. Applicability. This pamphlet applies to the Savannah District.

3. Reference.

a. AR 385 series

b. ER 385 series

c. EM 385-1-1

4. Procedures. This pamphlet is written to provide guidance in preparing an activity hazard analysis for each major phase of work (processes pesticide application) for District facilities such as Area, Resident and Project Offices, locks and dams, shops, and Corps contractors. It may also be used by Corps personnel when reviewing and Activity Hazard Analysis submitted by contractors. This pamphlet will take the user through a step-by-step procedure. It will offer suggestions and explanations to help in the preparation of a complete analysis.

/s/
RALPH V. LOCURCIO
Colonel, Corps of Engineers
Commanding

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APPENDIX A

1. INTRODUCTION:

An activity hazard analysis for each major phase of work is required by EM 385-1-1 (Safety & Health Requirements Manual). This analysis utilized correctly will have favorable effects on your safety record. This pamphlet provides guidance for preparing an activity hazard through a step-by-step procedure giving an example, explanations, and definitions. By showing this procedure, we hope to increase your understanding of how and why the analysis is used.

2. THE ACTIVITY HAZARD ANALYSIS - AN OVERVIEW

a. An activity hazard analysis is a procedure used to review job methods and find hazards. These hazards may have been overlooked from the start or they may have developed after production work was started. Once the hazards are identified, a solution or control can be developed.

b. The person best suited to develop the analysis is the foreman or line supervisor. The first reason is that the foreman has most likely put his time in at the "trench level." He has probably spent 5-10 years doing the job that he is now supervising. He has made mistakes, seen the hazards, and probably has the best suggestions on how to make the job safer. The second reason for this choice will be discussed in detail in Step 2.

c. Once the analysis rough draft is done, it should be reviewed by a person within your organization who has safety responsibilities. This person will review the analysis on a technical level, check to see if any hazards were overlooked, and review the control measures to see if the best solutions were chosen.

(1) Step 1 - Selecting and Activity to Analyze.

(a) An activity is a sequence of separate steps that together accomplish a work goal. Some activities can be broadly defined in general terms of what is accomplished. Making paper, building a new dorm, mining ore are examples. Such broadly defined activities are not suitable for a hazard analysis. Similarly, an activity can be narrowly defined in terms of a single action. Pulling a switch,

tightening a screw, pushing a button are examples. Such narrowly defined activities also are not suitable for a hazard analysis.

(b) Activities suitable for a hazard analysis are those generally assigned to a line supervisor and related to a particular phase of work. Erecting block walls, placing a roof, and painting are good subjects for hazard analysis. It is for this reason that the Corps of Engineers requires a hazard analysis for each major phase of work.

(c) Once an activity or major phase has been selected, complete the analysis using form shown in Appendix B., Page B-1.

(2) Step 2 - Break Activity Down Into Successive Steps.

(a) Break the activity down its principal steps. You, the line supervisor, or foreman should rely on past experiences with this type of work being analyzed. Know your work goal (end point), the beginning point, and what you have to do to accomplish the work goal (steps). Visualize a logical progression step by step.

(b) Record the steps in their natural order of occurrence. Describe what is done, not details of how it is done. Usually three or four words are sufficient. Number the steps consecutively.

(c) In the example (Appendix B, Page B-2), the progression of principal steps should include the following: required personal protective equipment, housekeeping, cave-ins access to/from excavation, and equipment.

(3) Step 3 - Identify Hazards and Potential Mishaps.

(a) Identify the potential hazard encountered in each of the principal steps listed. Past experience should be relied upon heavily. Talking to the workers about past accidents or near misses will be of help to you. Checking first-aid logs or accident investigations will also be of help. Evaluate hazards presented by other activities working adjacent to activity being analyzed.

(b) The following is a list of questions that also will help you identify most of the hazards:

1. Is there danger of striking, being struck by or otherwise making injurious contact with an object.

2. Can an employee be caught in, or between objects?

3. Can an employee slip or trip? Can employee fall on the same level or to another?

4. Can employee suffer strain by pushing, pulling or lifting?

5. Is there a possibility of electrical, health, or fire hazards associated with that principal step?

(c) It is estimated that with these questions you should be able to uncover 90% of the potential hazards. What about the other 10%? The other 10% is what makes the activity hazard analysis so unique. This is why the so called "generic analysis" is a very incomplete analysis. Factors unique to an activity (elevation, terrain, weather, etc.) may add to or change the potential hazards. All this must be taken into consideration when doing the analysis.

(d) In the example (Appendix B), we have listed most of the hazards associated with the principal steps. These are very general due to the lack of specific project information. The purpose of this is to keep the analysis simple and easy to follow. If a foreman or line supervisor prepared the analysis in Appendix B, with all the specific information available, it would be more complete and extensive.

(4) Step 4 - Develop a Control for Each Hazard Identified.

(a) Develop solution to the Hazards presented in Step 3 of this procedure. There may be several solutions to the hazard. Decide which solution is the most beneficial for the situation. You must ask yourself what are the benefits to this solution? Sometimes the solution will solve that particular problem but create a new hazard for that step or another step. Once again it is useful to ask the workers for suggestions.

(b) The following are suggestions to help you come up with ideals for the best solution to your particular hazard:

1. Change the Physical Conditions that Create the Hazard. What change in physical condition will eliminate the hazard or prevent the accident? A good example of this would be changing the surface in a work area to non-slip type surface or supplying ear muffs to a worker who must travel through an area in which noise levels exceed the standard.

2. Change the Procedures of the Step. What should the employee do or not do to eliminate the hazard or prevent this potential mishap? For example, does the employee have to go through the noisy area to reach his work area? Is there another way to go there? If there is, will it be more or less hazardous for the employee? You should consider work-saving tools or equipment. If a worker has to lift and carry a heavy object onto a workbench, supply the worker with a workbench that has casters. Also, using two workers to lift the object onto the portable workbench would reduce the chances of backstrain.

3. Reduce the Frequency that a Task Must Be Performed. What can be done to reduce the number of times an employee must perform this task? Every task has some potential for an accident to occur. When you listed potential hazards in Step 3, you recognized the fact that actions have a higher probability of causing an accident that normal tasks. Therefore, if you can find a way to reduce the number of times an employee must perform a task, you can also reduce the probability of an accident happening.

4. Training. If none of the previous suggestions is appliance, training employees to do their safely may be the answer. Quite often we hear of accidents caused by lack of knowledge of proper safety procedures. Simple instructions from you, the line supervisor, foreman, or specialized training from outside sources, might be required. Often, specialized training is needed for irregular work which may be unique.

(c) Special attention should be give to newer (1-1/2 year or less) employees. These employees have proven to be among the most likely to have accident. This is why it is good practice for employers to give a new employee good initial safety training.

(d) Once you have decided on a control for the hazard, you must put it into a positive statement. "Dust respirators will be supplied to the workmen." "Electricity

to the building will be locked out by a mechanical device." In other words, you will be committing yourself to perform the action you chose as a control.

(e) If you now turn to the example (Appendix B), you will find a copy of our completed analysis. As an exercise, go back through Step 1 through Step 4. See if you can come up with anything that we left out.

3. Update as Needed. It should be noted that the completed analysis is not set in stone. We all know that field changes take place every day. With these changes a new hazard may be created. Also, for example, a delay in a different activity could have you working next to that operation. This could add a multitude of hazards to your job. We can now see that for the hazard analysis to be effective, it should be updated as the activity progresses.

4. Benefits.

a. A complete activity hazard analysis will reap many rewards. If you can reduce your number of accidents using the activity hazard analysis process, you can expect to see a reduction in your frequency rate.

b. Accidents cost money. For every accident there are obvious costs (doctor, hospitals, etc.) as well as the hidden costs (training a new employee to do that job, drop in morale, etc.). By reducing the accidents you can save money, thereby increasing your productivity.

c. Safety training benefits your organization. Establishing safety contacts between the line supervisor and worker (one on one) promotes good safety awareness and increases morale. This is very important for new employees.

d. Training in the proper methods of performing certain tasks will in most cases, increase productivity. An increase in productivity always turns into an increase in profits.

ACTIVITY HAZARD ANALYSIS

1. Phase of Construction		
EXCAVATIONS		
2. Location	3. Contract No.	4. Project
5. Prime Contractor	6. Date of Preparatory	7. Estimated Start Date

Potential Safety Hazard	Procedure to Control Hazard
1. Require and/or recommended personal protective equipment.	1. Hard hats, metatarsal shoes, rubber boots, gloves and safety glasses or shields where required.
2. Housekeeping	1. The CQC shall make certain that the job site be cleaned up at the end of each day. Collect and store all scrap lumber, waste material, and rubbish in piles or containers for regular, at least daily, removal and disposal. 2. The CQC shall make certain that tools, materials, extension cords, hoses or debris do not cause tripping or other hazards. 3. Protruding nails in scrap boards, planks, and timbers shall be removed, hammered in, or bent over flush with the wood. 4. Place centrally located proper containers and barrels at site for workmen to dispose of drinking cups, lunch sacks, and related items. Empty these containers daily or more frequently, depending upon need. 5. Place all rags, waste, etc., soiled by combustible or flammable material, in tightly closed metal containers.
3. Cave-ins	1. The sides of all excavations in which employees are exposed to danger from moving ground shall be guarded by a shoring system, sloping of the ground, or other equivalent means. All slopes shall be excavated to at least the angle of repose. 2. Excavations below the level of the base of footing of any foundation or retaining wall will not be permitted unless the wall is underpinned and all other precautions taken to insure the stability of the adjacent walls.

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Potential Safety Hazard	Procedure to Control Hazard
	3. Diversion ditches, dikes, or other means will be used to prevent surface water entering an excavation and to provide good drainage of the area adjacent to the excavation. 4. Excavated material will be stored and retained at least 2 feet from the edge of the excavation and at a distance to prevent excessive loading on the face of the excavation. 5. Boulders, stumps, or other materials that may slide or roll into the excavation shall be removed or made safe. 6. Guardrails, fences, barricades, warning lights, or other illumination maintained from sunset to sunup, shall be placed at all excavations which are adjacent to paths, walkways, sidewalks, and Buildings. 7. All wells, calyx holes, pits, shafts, etc., shall be barricaded or covered. Upon completion of exploration and similar operations, temporary wells, calyx holes, pits, shafts, etc., shall be backfilled immediately. 8. Support systems will be planned and designed by a qualified person when an excavation is in excess of 20 feet in depth, adjacent to structures or improvements, or subject to vibration or ground water.
4. Adjoining Buildings	1. When a stability bracing or underpinning designed by a qualified person is provided, such shoring, bracing, or underpinning shall be inspected daily or more often as conditions warrant by a qualified person.
5. Access into or out of excavations	1. At least two means of exit will be provided for personnel working in excavations. Where the width of the excavation exceeds 100 feet, two or more means of exit shall be provided on each side of the excavation.

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Potential Safety Hazard	Procedure to Control Hazard
	2. Ladders used as accessways shall extend from the bottom of the trench to not less than 3 feet above the surface. Lateral travel to an exit ladder shall not exceed 25 feet.
6. Construction Equipment	1. All machinery and mechanized equipment will be inspected and tested by a competent mechanic and certified to be in safe operating condition before placing in use. Records of test and inspections will be maintained at the site and shall be made available upon request of the designated authority. SAD Form 1666-R will be used. 2. ROPS will be installed in accordance with the manufacturer's or designer's recommendations. Certification from the manufacturer or registered professional engineer that all ROPS comply with applicant standards shall be furnished the COR upon request. 3. Seatbelts and anchorages meeting the requirements of 49 CFR 571 (Department of Transportation Federal Motor Vehicle Safety Standards) will be installed and worn in all motor vehicles. Two piece seat belts and anchorages for construction equipment shall comply with applicable Federal specifications or SAE J 386a and will be worn. 4. All self-propelled construction equipment, except light service trucks, panels, pickups, station wagon, crawler cranes, power shovels, and draglines, whether moving alone or in combination, shall be equipped with a reverse signal alarm. Alarm shall be audible and sufficiently distinct to be heard under prevailing conditions. Alarm shall operate automatically upon commencement of backward motion. Alarm may be continuous or intermittent (not to exceed 3-second intervals) and shall operate during the entire backward movement. Electrical alarms will meet SAE J 994b. Equipment designed and operated so that the operator is always facing the direction of motion does not require

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Potential Safety Hazard	Procedure to Control Hazard
	reverse signal alarms. 5. A competent person will be designated to be responsible for the inspection of all machinery and equipment daily and during use to make sure it is in safe operating condition. Tests will be made at the beginning of each shift during which the equipment is to be used to determine that the brakes and operating systems are in proper working condition. 6. Any machinery or equipment found to be unsafe shall be deadlined and its use prohibited until unsafe conditions have been corrected. 7. Excavating or hoisting equipment will not be allowed to raise, lower, or swing loads over personnel in the excavation without substantial overhead protection. 8. All equipment, trucks, and other loads will be kept from the edge of all excavations at a distance equal to one-half the depth of the excavation.

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